

site and all instrumentation required to perform the
measurements. 658

The Contractor shall furnish a final test report of 660
the measurements which shall include comparisons to calculated 661
values, refinements in the rotor model reflecting test results,
and appropriate conclusions.

6. ASME Performance Test: The Contractor shall test 664
the Turbine-Generator Units in accordance with ASME PTC 6, -
1976, and as specified hereinafter. These tests shall 666
hereinafter be referred to as the TEST.

6.1 Objective of Test and Methods of Operation - Par. 668
3.02 (a) of PTC 6: The objective of the TEST is to determine 669
compliance with the Contractor's guarantees.

Each unit shall be tested using the TEST. The results 672
of the TEST shall be used to determine compliance with the
guaranteed heat rate and capacity.

The TEST for each Unit will be conducted using the 674
Contractor's automatic data collection and reduction system.

The Contractor shall prepare and submit to the Project 676
Manager for comment a preliminary test report with all data, 677
computer calculations, hand verifications, and all technical
information involved in the calculations for comment. A final 679
report shall be issued within 30 calendar days after agreement
on the report has been reached between the Contractor and the 680
Project Manager.

6.2 Timing of Test and Operating Conditions - Par. 682
3.02 (b) of PTC 6: All reasonable effort shall be expended to 683
conduct the TEST within 8 weeks of initial synchronization of 684
each Unit in accordance with PTC 6.

The Contractor shall conduct an initial performance 686
bench mark test on the Turbine-Generator Unit in accordance with 687
Par. 3.05 of PTC 6 immediately after initial start-up.

The TEST shall be conducted and considered valid if 689
performance of the high- and intermediate-pressure turbines 690
indicate deterioration equal to or less than one percent and
one-half percent respectively, as determined by the difference 691
between the initial performance bench mark test and one 692
conducted just prior to the TEST.

If deterioration as determined by the before-mentioned performance bench mark test is greater than the specified limits, the TEST shall be performed after the inspection and repair outage. 694 695

Operating conditions for the TEST shall be in accordance with Table 3.1 of PTC 6. 697

The performance guarantee shall be in accordance with the latest guaranteed heat balances for the 3 points specified in the contract. 699 700

The TEST heat rates shall be reported as calculated from the test observations with only such corrections as provided for in ASME PTC 6. The allowance for inaccuracies in the test procedure shall not exceed 0.1 percent and no damages for failure to meet the heat rate guaranteed shall be assessed until this percent has been exceeded. 702 703 704 705

For determining contractual compliance with the guarantee points, the TEST heat rates shall be determined using the following control valve settings: 707 708

(a) Two valves open 710

(b) Three valves open 712

(c) Four valves open 714

The guarantee values of heat rate at the specified valve point kilowatt load will be compared to the respective valve points determined from the TEST. 716 717

The 820,000 kW heat rate will be established as follows: 719

(a) Determine the equation for the straight line between the contract heat balance heat rates at 3 valves open and 4 valves open. 721 722

(b) Calculate the heat rate at 820,000 kW from the equation determined in (a) above. 724

(c) Calculate the absolute difference between the heat rate determined in (b) above and the specified contract 820,000 kW guaranteed heat rate. 726 727

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(d) Determine the equation for the straight line between the 3 valves open and 4 valves open TEST heat rates.	729 730
(e) Calculate the TEST heat rate at 820,000 kW from the above equation.	732
(f) Subtract the value obtained from (c) above from that obtained from (e) above to get the resultant corrected TEST heat rate at 820,000 kW and compare with the guaranteed heat rate.	734 735
6.3 Location of Piping and Instruments - Pars. 3.02 (c) Through 3.02 (i) of PTC 6: The number of instruments and their general location shall be in accordance with Section 4 and Figure 4.1a of ASME PTC 6.	738 741 742
To establish the actual locations of the instruments:	744
The Engineer will send Piping and Instrument Diagrams (P&IDs) to the Contractor for review and comments on the TEST instrumentation. The Contractor shall return P&IDs with comments within 30 calendar days after receipt of such diagrams.	746 747 748 749
The Engineer will send the bid issue detailed piping drawings showing the locations of the TEST instrumentation to the Contractor for review and comments. The Contractor shall return the drawings with comments on the TEST instrumentation within 30 calendar days.	751 752 753
6.4 Method of Determining Steam Quality - Par. 3.02 (k) of PTC 6: Not applicable.	755 757
6.5 Method of Arresting Control Valve Action - Par. 3.02 (k) of PTC 6: Control valve action shall be arrested in accordance with Contractor's recommendations.	759 760
6.6 Method of Determining Differential Pressure Across Final Control Valve - Par. 3.02 (l) of PTC 6: Not applicable.	762 764
6.7 Nuclear Requirements - Par. 3.02 (m) of PTC 6: Not applicable.	766 767
6.8 Means of Maintaining Constant Test Conditions - Par. 3.03- (a) of PTC 6: Test conditions shall be maintained for not less than one hour prior to starting the test period. Constant load shall be secured in accordance with Par. 3.02 (k) of PTC 6.	769 771 772

6.9	Type and Calibration of Instruments - Par. 3.03	774
(b) of PTC 6:	Type of instruments and their calibration shall be as follows:	775
<u>Temperature</u>	<u>Pressure</u>	<u>Flow</u>
		<u>Load</u>
		779
	<u>TYPE</u>	781
Chromel	Transducers	1. Primary
Constantan		throat tap
Thermocouples		nozzles
		Three single
		phase watt hour
		meters with
		dedicated PTs
		and associated
		wiring.
		785
		786
		2. Secondary
		orifices
		788
		3. Turbine
		meters
		790
		791
		4. Forward and
		reverse tubes
		(U.V.M.)
		793
		794
		795
	<u>CALIBRATION</u>	797
General	IPP plant site	Worcester
Electric		Polytechnic
Laboratory		Institute
		General Electric
		Laboratory
		800
		801
		All calibrations shall be traceable back to the
		National Bureau of Standards. Calibration of all pressure
		transducers shall be conducted before and after the TEST.
		805
		807
		6.10 Methods of Measurement Not Established by
		Subarticle 6.9 - Par. 3.03 (c) of PTC 6: Any methods of
		measurement not established by Subarticle 6.9 of this Division
		shall be resolved at the plant site by the Engineer and the
		Contractor.
		809
		811
		812
		6.11 Isolation of Cycle During Test - Par. 3.03 (d)
		of PTC 6: Isolation of the cycle during the TEST shall be
		defined by the Engineer and the Contractor at the time of the
		drawing review specified in Subarticle 6.3 of this Division.
		814
		816
		817
		6.12 Organization, Training, Directing, Recording,
		and Calculating - Par 3.03 (e) of PTC 6: The TEST shall be
		directed by the Engineer. Training of observers, recording, and
		820
		823
		824

calculating test results shall be provided by the Contractor and their automatic data acquisition system. 825

6.13 Frequency of Observations - Par. 3.03 (f) of PTC 6: 828
During each 2-hour test, pressure and temperature 831
shall be recorded every 2 minutes, primary flow shall be 832
recorded every 20 seconds, and kilowatt hours shall be measured
in 2-minute intervals.

6.14 Operating Conditions - Par. 3.03 (g) of PTC 6: 834
TESTs shall be conducted at: 835

(a) The valve points. 837

(b) Valves open at 5 percent overpressure. 839

(c) Other conditions as required by the Engineer 841
at the time of the TEST.

6.15 Number of Tests - Par. 3.03 (h) of PTC 6: 843
Duplicate tests shall be performed at all valve points and at 844
other conditions as required by the Engineer at the time of the 845
TEST. Agreement between duplicate test runs shall be in 846
accordance with Par. 3.19 of PTC 6.

6.16 Corrections for Deviations From Test Conditions - 849
Par. 3.03 (i) of PTC 6: Correction curves shall be provided in 852
the Contractor's Thermal Kit.

6.17 Conducting Correction Factor Determination 855
Tests - Par. 3.03 (j) of PTC 6: Correction curves shall be 858
verified at the discretion of the Engineer at the time of the
TEST.

6.18 Test Duration - Par. 3.03 (k) of PTC 6: Test 861
runs shall be 2 hours in duration.

6.19 Duration of Operation at Test Condition Prior 864
to Testing - Par. 3.03 (l) of PTC 6: The turbine-generator 867
shall be operated at the test load not less than one hour before
test readings commence.

6.20 Method of Determining Turbine Condition Prior to 870
Testing - Par. 3.03 (m) of PTC 6: The condition of the turbine 872
prior to the TEST shall be determined by a performance bench
mark test.